

Clean Shrimp (*Caridina multidentata*)

Ecological Risk Screening Summary

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1 Native Range and Status in the United States

Native Range

From De Grave et al. (2013):

“Native: Japan; Taiwan, Province of China (Taiwan, Province of China (main island))”

From Ortmann (1894):

“Geographical distribution: Bonin Isl. (Stimpson [1860]); Celebes (De Man [1892]).”

The Bonin Islands, also known as the Ogasawara Islands are an archipelago approximately 1000 km south of Tokyo, Japan. The Celebes, now known as Sulawesi, is an island in Indonesia.

Status in the United States

No records of *Caridina multidentata* in the United States were found.

Means of Introductions in the United States

No records of *Caridina multidentata* in the United States were found.

Remarks

From De Grave et al. (2013):

“In literature, the species is known from Japan, Taiwan, Fiji and Madagascar (Cai et al. 2006), however the records from Fiji and Madagascar are considered erroneous and herein considered to refer to other species.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From De Grave et al. (2013):

“In older literature this species is usually listed under the name *Caridina japonica* De Man, 1892. Cai et al. (2006) demonstrated that *C. multidentata* Stimpson, 1860 is a senior synonym of *C. japonica*.”

From Fransen (2013):

“**Classification:** Biota > Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Eucarida (Superorder) > Decapoda (Order) > Pleocyemata (Suborder) > Caridea (Infraorder) > Atyoidea (Superfamily) > Atyidae (Family) > *Caridina* (Genus) > *Caridina multidentata* (Species)”

“**Status:** accepted”

“**Synonymised names:** *Caridina japonica* de Man, 1892
Cardinia japonica sikokuensis Kubo, 1938
Caridina voeltzkowi Lenz, 1910”

Size, Weight, and Age Range

Information on the size, weight, and age range of *Caridina multidentata* was not found.

Environment

From De Grave et al. (2013):

“The species lives in large rivers with a boulder substrate”

“Freshwater”

Climate/Range

Information on the climate requirements of *Caridina multidentata* was not found.

Distribution Outside the United States

Native

From De Grave et al. (2013):

“Native: Japan; Taiwan, Province of China (Taiwan, Province of China (main island))”

Introduced

No records of *Caridina multidentata* introductions were found.

Means of Introduction Outside the United States

From Patoka et al. (2015):

“We examined a shipment of aquarium fauna that arrived from Jakarta (Indonesia) to Prague (Czech Republic) in May 2015. The shipments contained many non-native fishes and three popular freshwater shrimp species in the family Atyidae: *Caridina cantonensis* Yü, *C. multidentata* Stimpson, and *Neocaridina denticulata* (Kemp).”

“Total numbers of shrimps in the surveyed shipment were 1000 *C. multidentata* and 500 *N. denticulata*. An approximation of the monthly total number of these species imported into the Czech Republic by all wholesalers is 40,000 individuals of *C. multidentata* and 20,000 individuals of *N. denticulata*”

There are no records indicating that introductions have resulted from this pathway.

Short Description

From Cai et al. (2006):

“Stimpson (1860) described *C. multidentata* from Bonin Islands (Ogasawara Islands) in the following words: “[...] [Rostrum medium, reaching to ultimate segment of antennular peduncle, dorsal crest ridged dilated, bending against base of ocular region, serrated with 20-30 denticles; upper surface stout, sharp, heavily denticulate; lower margin with 14 denticles. Margin of carapace armed anteriorly with antennal spine. Second pair of legs longer than antennular peduncle; carpus elongate, fingers small, thick pointed, flattened, tip expanded. Dactylus of posterior legs sharp, penultimate article of seventh part longitudinally not produced. Caudal segment dorsally not concave, equal in size to fifth, with large lateral ridges, tip of caudal segment twice as long, triangular.]”

Biology

Information on the biology of *Caridina multidentata* was not found.

Human Uses

From Patoka et al. (2015):

“We examined a shipment of aquarium fauna that arrived from Jakarta (Indonesia) to Prague (Czech Republic) in May 2015. The shipments contained many non-native fishes and three popular freshwater shrimp species in the family Atyidae: *Caridina cantonensis* Yü, *C. multidentata* Stimpson, and *Neocaridina denticulata* (Kemp).”

Diseases

No OIE reportable diseases.

From Patoka et al. (2015):

“No commensal animals were found associated with *C. cantonensis*, but heavy infestations of the scutariellid temnocephalidan *Caridinicola* sp. and the stalked protozoan *Vorticella* sp. were found on both *Caridina multidentata* and *N. denticulata*.”

Threat to Humans

Information on threats to humans from *Caridina multidentata* was not found.

3 Impacts of Introductions

No records of *Caridina multidentata* introductions were found.

4 Global Distribution



Figure 1. Known global distribution of *Caridina multidentata*. Map from GBIF (2013).

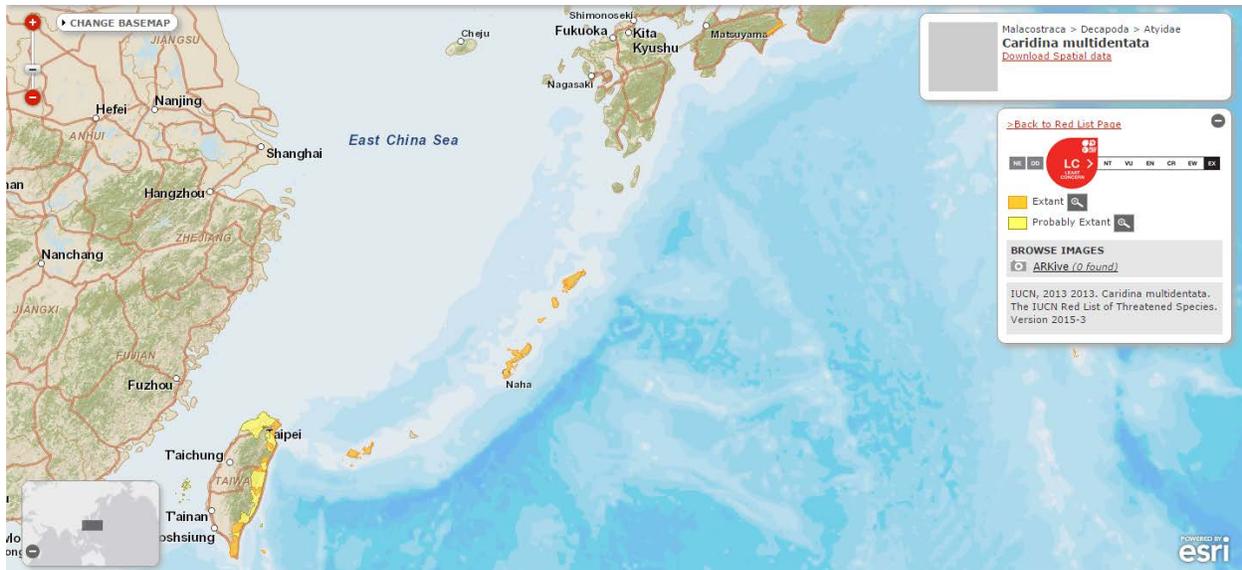


Figure 2. Known global distribution of *Caridina multidentata*. Map from De Grave et al. (2013).

Populations where the identification of the species was in question, such as Madagascar and Fiji, were not included in the climate match.

5 Distribution Within the United States

No records of *Caridina multidentata* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Caridina multidentata* was high in Florida and low everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for the continental United States was 0.013, medium, and individually high in Florida.

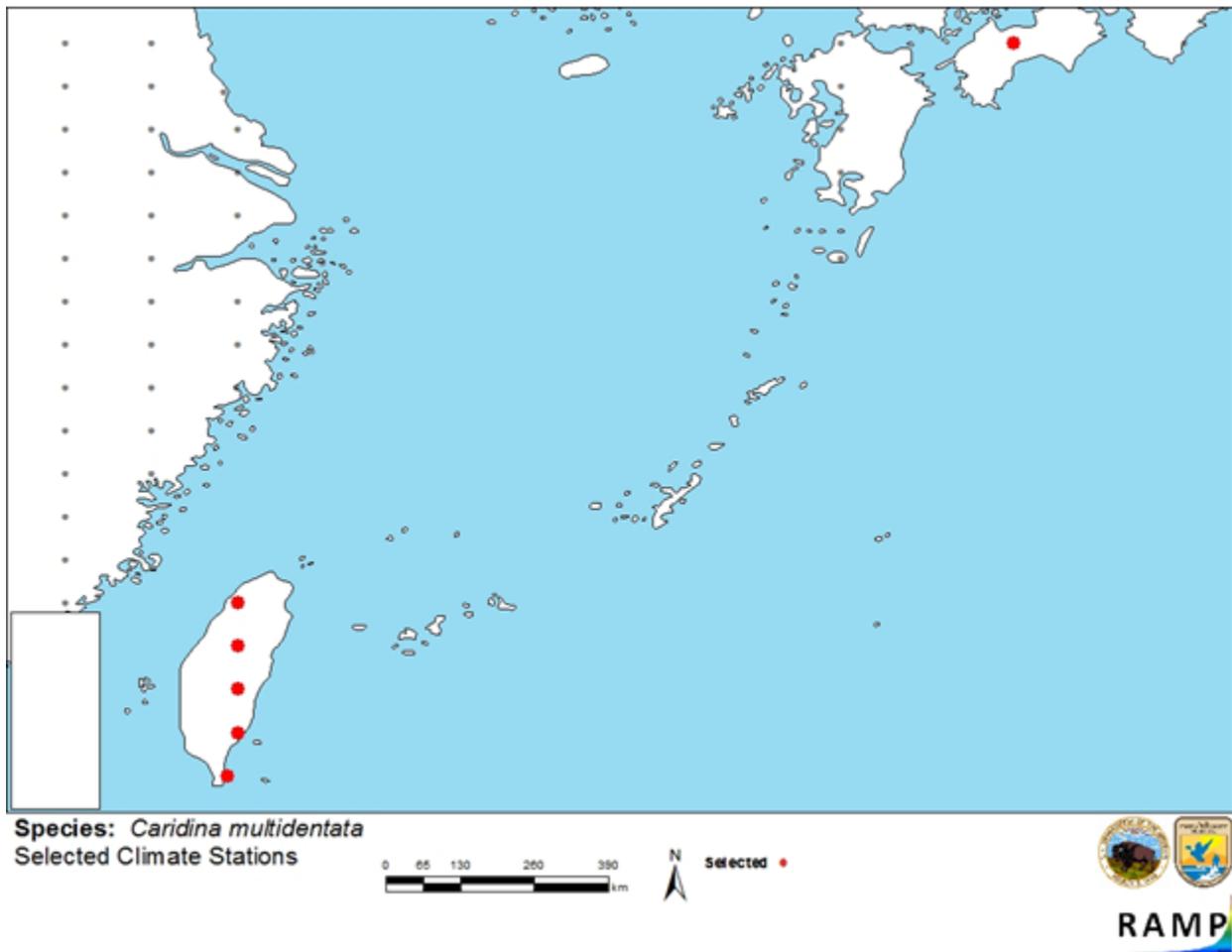


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (grey) for *Caridina multidentata* climate matching. Source locations from De Grave et al. (2013) and GBIF (2013).

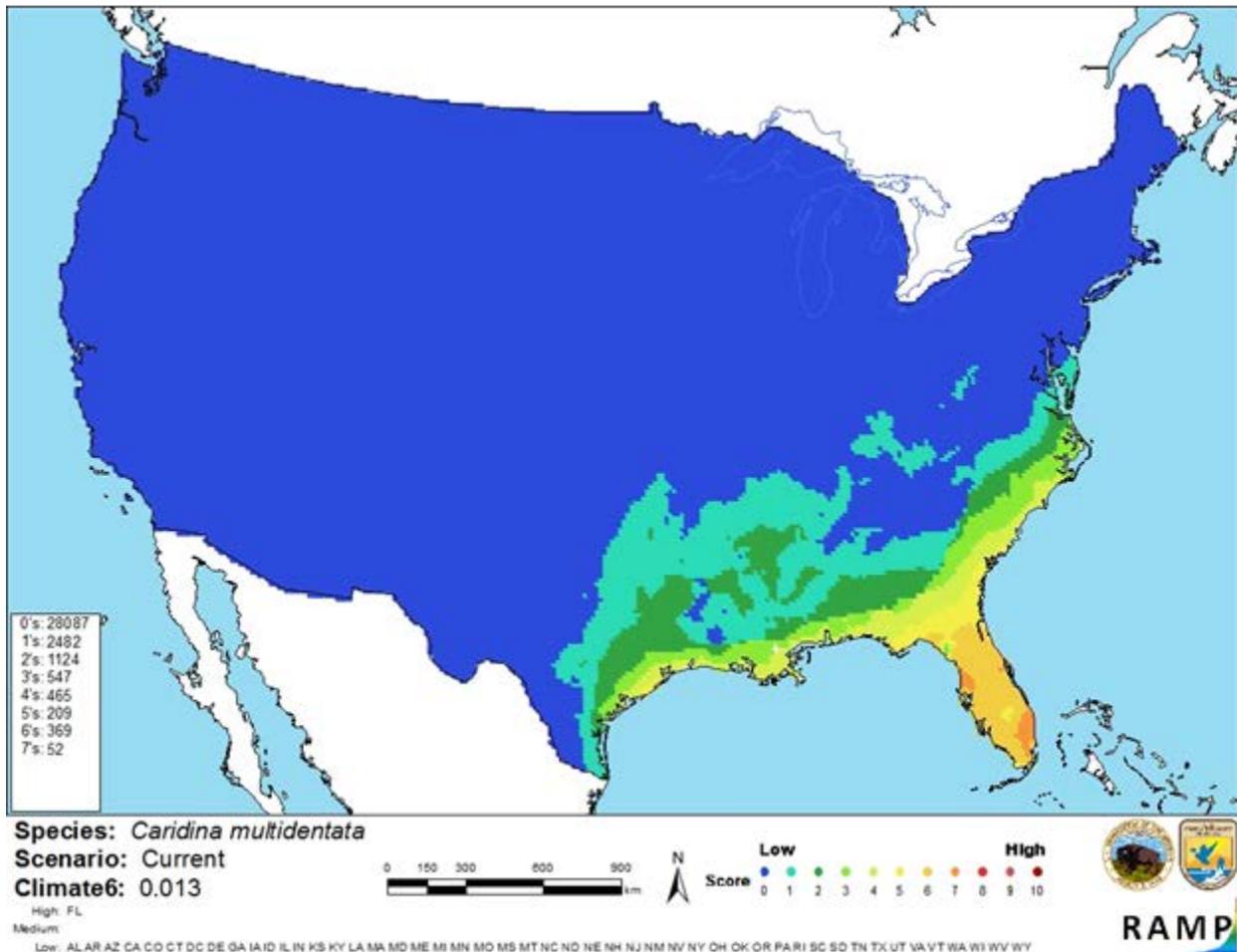


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Caridina multidentata* in the continental United States based on source locations reported by De Grave et al. (2013) and GBIF (2013). 0 = Lowest match, 10 = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of this assessment is medium. Some information was available about *Caridina multidentata*. Searches were conducted under *C. multidentata* and *C. japonica*. There is some confusion on the distribution of the species. The populations in Madagascar and Fiji are identified variously as *C. multidentata*, *C. japonica*, or a subspecies of *C. multidentata*. No

records of introductions were found. A better understanding of the taxonomy, distribution, and ecology of the species may alter the results of this assessment.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness is low. *Caridina multidentata* is heavily present in the pet trade (Patoka et al. 2015) and there were no records of introduction found. The climate match is medium. The results of the climate match could change depending on a better understanding on the distribution. The certainty of assessment is medium. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3):** Low
- **Climate Match (Sec. 6):** Medium
- **Certainty of Assessment (Sec. 7):** Medium
- **Remarks/Important additional information** No additional remarks.
- **Overall Risk Assessment Category:** Uncertain

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

- Cai, Y., P. K. L. Ng, S. Shokita, and K. Satake. 2006. On the species of Japanese atyid shrimps (Decapoda: Caridea) described by William Stimpson (1860). *Journal of Crustacean Biology* 26(3):392-419.
- De Grave, S., J. Shy, and X. Cai. 2013. *Caridina multidentata*. The IUCN red list of threatened species. Version 2013.2. Available: <http://www.iucnredlist.org/details/198258/0>. (March 2014).
- Fransen, C. 2013. *Caridina multidentata* Stimpson, 1860. In *World Register of Marine Species*. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=586329>. (March 2014).
- GBIF (The Global Biodiversity Information Facility). 2013. GBIF backbone taxonomy. Available: <http://www.gbif.org/species/5863054>. (February 2017).
- Ortmann, A. E. 1894. A study of the systematic and geographical distribution of the decapod family Atyidae Kingsley. *Proceedings of the Academy of Natural Sciences of Philadelphia* 46(1894):397-416.

Patoka, J., M. Bláha, M. Devetter, K. Rylková, Z. Čadková, and L. Kalous. 2015. Aquarium hitchhikers: attached commensals imported with freshwater shrimps via the pet trade. *Biological Invasions* [online]. DOI 10.1007/s10530-015-1018-9.

Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. U.S. Fish and Wildlife Service.

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

De Man, J. G. 1892. Decapoden des Indischen Archipels. Pages 380 *in* M. Weber. *Zoologische Ergebnisse einer Reise in Niederlndisch Ost-Indien*.

Stimpson, W. 1860. Prodrumus descriptionis animalium evertibratorum, quae in Expeditione ad Oceanum Pacificum Septemtrionalem, a Republica Federata missa, C. Ringgold et J. Rodgers, observavit et descriptist. *Proceedings of the Academy of Natural Science of Philadelphia* 1860(January):22-47.